JUL 3 0 2001

JC20 Rec'd PCT/PTO 3 0 JUL 2001

U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE **TRANMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**		ATTORNEY'S DOCKET NUMBER PATARCHI 3 U S APPLICATION NO. (If known,see 37 CFR 1 5) 09/890238
INTERNATIONAL APPLICATION NO. PCT/IT99/00388	INTERNATIONAL FILING DATE 25 November 1999	PRIORITY CLAIMED 28 January 1999
TITLE OF INVENTION PERMANENT MAGNET ELECTRIC MACHINE WITH ENERGY SAVING CONTROL		
APPLICANT(S) FOR DO/EO/US **A. PATARCHI**		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] The US has been elected in a Demand by the expiration of 19 months from the priority date (PCT Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is attached hereto (required only if not transmitted by the International Bureau).
   b. [X] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
7. [X] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c [ ] have not been made, however, the time limit for making such amendments has NOT expired.
   d. [X] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An Assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:
    [X] Courtesy copy of the International Application as filed.
    [X] Courtesy copy of the first page of the International Publication (WO 00/45501).
    [X] Courtesy copy of the International Preliminary Examination Report. There were no annexes.
    [X] Formal drawings, 5 sheets, Figures 1-7.
    [X] Courtesy Copy of the International Search Report.

JC17 Rec'd PCT/PTO 30 JUL 2001

U.S. APPLICATION NO (If known,see 37 CFR 1 5)	International Application No	Attorney's Docket No.
09/890238	PCT/IT99/00388	PATARCHI 3

17. [xx] The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a)(1) –(5):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.................**$1000.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO...........**$860.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO...................**$710.00**

International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)....... ....**$690.00**

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)................ ......**$100.00**

				CALCULATIONS	PTO USE ONLY
ENTER APPROPRIATE BASIC FEE AMOUNT =				$ 860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$	
Claims as Originally Presented	Number Filed	Number Extra	Rate		
Total Claims	16 - 20		X $18.00	$	
Independent Claims	1 - 3		X $80.00	$	
Multiple Dependent Claims (if applicable)			+$270.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 860.00	
Claims After Post Filing Prel. Amend	Number Filed	Number Extra	Rate		
Total Claims	- 20		X $18.00	$	
Independent Claims	- 3		X $78.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 860.00	
Reduction of ½ for filing by small entity, if applicable. Applicant claims small entity status. See 37 CFR 1.27.				$ 430.00	
SUBTOTAL =				$ 430.00	
Processing fee of **$130.00** for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE =				$ 430.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$	
TOTAL FEES ENCLOSED =				$ 430.00	
				Amount to be: refunded	$
				charged	$

a. [ ] A check in the amount of $____________ to cover the above fees is enclosed.

b. [X] Credit Card Payment Form (PTO-2038), authorizing payment in the amount of $ 430.00, is attached.

c. [ ] Please charge my Deposit Account No. **02-4035** in the amount of $____________ to cover the above fees. A duplicate copy of this sheet is enclosed.

d. [XX] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **02-4035**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

BROWDY AND NEIMARK, P.L.L.C.
624 NINTH STREET, N.W., SUITE 300
WASHINGTON, D.C. 20001
TEL: (202) 628-5197
FAX: (202) 737-3528

Date of this submission: **July 30, 2001**

SIGNATURE

Sheridan Neimark

NAME

20,520

REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

ATTY.'S DOCKET: PATARCHI 3

In re Application of: PATARCHI, A.	Art Unit:
	Examiner:
I.A. No.: PCT/IT99/00388	
Appln. No.: not yet assigned	Washington, D.C.
I.A. Filed: 25 November 1999	
Filed: even date herewith	July 30, 2001
For: PERMANENT MAGNET …	

PRELIMINARY AMENDMENT

Honorable Commissioner for Patents
Washington, D.C. 20231

Sir:

Contemporaneous with the filing of this case and prior to calculation of the filing fee, kindly amend as follows:

IN THE SPECIFICATION

After the title please insert the following paragraph:

--**REFERENCE TO RELATED APPLICATIONS**

The present application is the national stage under 35 U.S.C. 371 of international application PCT/IT99/00388, filed November 25, 1999, which designated the United States, and which international application was published under PCT Article 21(2) in the English language.--

In re appln. of A. PATARCHI (PATARCHI 3)

REMARKS

The above amendment to the specification is being made to insert reference to the PCT application of which the present case is a U.S. national stage.

Favorable consideration and allowance are earnestly solicited.

Respectfully submitted,
BROWDY AND NEIMARK, P.L.L.C.
Attorneys for Applicant

By: [signature]
Sheridan Neimark
Registration No. 20,520

SN:edg
Telephone No.: (202) 628-5197
Facsimile No.: (202) 737-3528
f:\,b\bugr\patarchi3\pto\pre.amendment.doc

Description

PERMANENT MAGNET ELECTRIC MACHINE WITH ENERGY SAVING CONTROL

Technical Field

The present invention relates to an energy generator as a dynamo-electric machine with separate employment of the interacting forces and their balancing with permanent magnets.

The term "dynamo-electric machine" designates any machine which converts mechanical energy into electrical energy and vice versa. The type of machine whereto the present invention refers is the one wherein a primary comprises a multiplicity of polar expansions and a secondary comprises a succession of heteronomous alternated permanent magnets.

Background Art

It is well known that both in motors and in generators of this kind, electromagnets act by attraction or repulsion over the entire pitch of the magnets in two semi-cycles, that is to say at full cycles from permanent magnet to permanent magnet, and hence in none of the known motors or generators is the active effect of the interaction of the magnets with the highly permeable ferromagnetic cores taken into account, nor is the equilibrium i.e. the balancing of the ferromagnetic forces which cancel out the permanent magnetic resistant torque to pass from one permanent magnet to the other.

Disclosure of Invention

Although in the considerations that follow reference shall be made, for the sake of convenience, mostly to motors, the same considerations apply for generators as well.

In particular, the invention constituting the subject of the invention is aimed at

determining at relative disposition between the pairs of electromagnets of the primary and the permanent magnets of the secondary which is able to harmonise the forces at play, whose magnetic nature is respectively permanent, ferromagnetic and electromagnetic.

Another aim of the present invention is to reach a high efficiency in the transformation of electrical into mechanical energy and vice versa thanks to an appropriate electrical power supply of the electromagnets of the primary in their interaction with the permanent magnets of the secondary.

Yet another aim of the present invention is to provide an electric motor which can be controlled by an appropriate control system according to the characteristics required in each particular case, with adequate sensors such as optical, magnetic, resistive, inductive or other types of transducers which, through electronic circuits with transistors, thyristors, or triac, drive the supply of power to the machine, as well as common brush collectors, able to provide current at alternating polar steps to the coils offset by a polar step, first one than the other in succession for four steps of complete cycle.

The invention, as it is characterised by the claims that follow, solves the problem of providing a dynamo-electric machine with the harmonisation of the interacting forces, of the type having a primary comprising one or more pairs of polar expansion positioned one at the centre of the permanent magnets and the others astride two permanent magnets, mutually distanced by a polar step and each provided with a ferromagnetic core and with at least one electromagnetic coil, and a secondary comprising a succession of alternate heteronomous permanent magnets, and a related control system, which from a general point of view, is characterised in that each polar step of electrical conduction spans half permanent magnet of said alternate heteronomous permanent magnets and in that said electrical conduction is driven at alternate phases: in the first step the coil or coils in negative feedback facing the centre of the permanent magnet, then in the second step the coil or coils in negative feedback which were astride the permanent magnets and which are in turn taken to

the centre, then the third step again the coil or coils in negative feedback of the first step but with opposite electrical polarity still in negative feedback, then the fourth step again the coil or coils in negative feedback of the second step with opposite electrical polarity still in negative feedback closing a complete electrical conduction cycle, the two phases are carried out for separate two fourths by a first coil of the balancing pair and for other separate two fourths by a second coil of the balancing pair offset by a polar step and always with electrical polarity suitable to obtain the negative feedback with the opposed permanent magnets and always at the output of each half alternate heteronomous permanent magnet. The invention lets the "natural "permanent magnetic force active in attraction of the alternate heteronomous permanent magnets with the high-permeability ferromagnetic cores be always unbalanced in attraction, first a ferromagnetic core than the other concurring to create a complete parallel and superposed dual cycle of "natural" mechanical energy which goes to the axis of the dynamo-electric machine together with the cycle of "artificial" electromagnetic energy transformed by negative feedback with the consequent addition of the two separate and parallel energies, obtaining a high efficiency of the machine of the invention.

Although in the present description the invention is described with reference to a rotatory dynamo-electric machine, it can also be applied to linear machines or annular linear machines and to devices for partial servo-controls.

Further features and advantages of the present invention shall become more readily apparent from the detailed description that follows, of preferred embodiments illustrated purely by way of non-limiting indication in the accompanying drawings.

Description of the Drawings

- Figure 1 schematically shows in cross section view an embodiment of a dynamo-electric machine according to the present invention;
- Figure 2 shows the basic components of the dynamo-electric machine of Figure 1 and a related diagram of the forces interacting between them;

- Figure 3 schematically shows a complete attraction and repulsion cycle between the basic components of the dynamo-electric machine of Figure 1;
- Figure 4 schematically shows a complete cycle of attraction and repulsion between pairs of electromagnets and magnets;
- Figure 5 shows a diagram of the electromagnetic energies at play in the cycle of Figure 4;
- Figure 6 shows a diagram of the ferromagnetic at play in the cycle of Figure 4;
- Figures 7 through 9 schematically show, in section view, respective different dispositions between primary electromagnets and secondary permanent magnets whereto the present invention can be applied.

Description of the Illustrative Embodiment

According to the present invention, Figure 1 schematically shows in cross section view an embodiment of an electric motor, taken for instance from an energy generator as dynamo-electric machine according to the present invention.

As shown in Figure 1, on a support base 1 is mounted a stator 2, the primary of the machine, coaxially to whose interior is a rotor 3, the secondary. In the stator 2 is provided one or more pair of polar expansions, two in the example shown, indicated as C_1 and C_2. The polar expansions E_1, E_2, E_3, E_4 and the pair C_1 with C_2 are mutually separated by a polar step (p), i.e. the distance measured on the air gap arc between the start of a permanent magnet and its centre (half magnet). Each polar expansion (E_1, E_2, E_3, E_4) is provided with a horseshoe shaped ferromagnetic core (A_1, A_2, A_3, A_4), and with electromagnetic coils (B_1, B_1', B_2, B_2', B_3, B_3', B_4, B_4'). In the secondary, the rotor 3 is provided with a succession of alternate heteronomous permanent magnets 3_1, 3_2, ..., 3_{10}, separated from the polar expansions E_1, E_2, E_3, E_4 by an air gap 4. Further provided is a system for controlling the motor, of a known kind, schematically illustrated in the brush collector 5, characterised by neutral polar steps (p_2) and conductor polar steps (p_1) for the alternating electrical switching of the coils (B_1, B_1', B_2, B_2') or (B_3, B_3', B_4, B_4'), with polarity inversion due to the negative

feedback with the heteronomous alternate permanent magnets on the output polar step of each half magnet.

In other words, the machine comprises one or more pairs C_1, C_2 of polar expansions, E_1 and E_3, E_2 and E_4, mechanically and electrically distanced by a polar step (p) equal to a fourth of a cycle and "half a permanent magnet" 3 whereof one expansion, E_1 and E_3, positioned opposing the full position of the alternated heteronomous permanent magnets 3_2 and 3_3, 3_7 and 3_8, and the other, E_2 and E_4, astride the permanent magnets, 3_4, 3_5 and 3_5, 3_6, 3_9, 3_{10} and 3_{10} 3_1, obtaining as a result a balanced equilibrium of the ferromagnetic torque forces interacting between the high permeability cores, A_1 and A_2, A_3 and A_4, with the alternated heteronomous permanent magnets, 3_1, 3_2,..., 3_{10}, and an electrical offset between the electromagnetic coils of the pair B_1, B_1' and B_2, B_2', B_3, B_3' and B_4, B_4', for the contiguous closure of the alternate steps superposed in the two complete and separate cycles of positive and negative energy on two heteronomous permanent magnets of opposite polarity in four fourths of a cycle (12, 14, 13 and 15; 16, 18, 19 and 17), each electromagnetic coil of the pair or group of coils equally positioned in phase (B_1, B_1', B_3 and B_3'; B_2, B_2', B_4 and B_4') alternatively act for two separate fourths of a cycle with "artificial electromagnetic or mechanical energy" (12 and 13; 14 and 15) during the conductor steps (p_1) and for two separate fourths of a cycle with "natural ferromagnetic energy" (16 and 17; 18 and 19) during the neutral steps (p_2) electrically isolated, through the related control system 5, completing the two cycles of separate, consecutive, superposed and parallel "artificial" energy 12, 14, 13 and 15 plus the "natural" energy 16, 18, 19 and 17. When the dynamo-electric machine operates as a generator of mechanical energy, i.e. as a motor, each electromagnetic coil or group of coils (B_1, B_1', B_3 and B_3'; B_2, B_2', B_4 and B_4') equally positioned are powered with positive and negative electrical current to obtain the negative feedback from the centre of the permanent magnets for the polar step (p_1) until the end of the permanent magnets at alternating steps 12, 14, 13 and 15 and contiguous for a complete repulsion cycle on two magnets of opposite polarity and for two separate fourths each

(12 and 14; 13 and 15) whilst the "natural" cycle of permanent magnetic attraction is conducted by the ferromagnetic cores (A_1, A_3; A_2, A_4) in parallel and superimposed to the "artificial" cycle during the neutral polar steps (p_2) of the non-powered coils (16, 18, 19 and 17) also for two separate two fourths each (16 and 17; 18 and 19); vice versa when the dynamo-electric machine operates as a generator of electrical energy it is powered with mechanical energy aided by the complete cycle of "natural" magnetic attraction during the neutral steps (p_2).

The illustrated embodiment of a polar expansion is related to an ideal circuit with the closure of the electromagnetic flow in a pair of successive permanent magnets with opposite polarity.

Hereafter, the description shall show how a dynamo-electric machine thus realised presents a harmonisation of the interacting forces and, as a consequence, a high efficiency.

For the sake of simplicity hereafter the case shall be considered of polar expansions not interacting with pairs of permanent magnets but with one permanent magnet at a time.

In particular, in the case wherein the machine operates as a motor, in Figure 2 the indications A_1 and B_1 denote respectively a ferromagnetic core and an electromagnetic coil of a polar expansion E_1 of the primary, and the indication 3_1 denotes a permanent magnet of the secondary. For the sake of convenience, the relative motion of the polar expansion of A_1, B_1, with respect to the permanent magnet 3_1 is considered, as if the rotor were fixed.

The ferromagnetic core of A_1 has high permeability so that it is attracted towards the permanent magnet 3_1, by the "natural" ferromagnetic attraction when the coil B_1 is not energised. The polar expansion E_1 moves to E_1'. The corresponding energy is proportional to the surface area of the right triangle 6. The "artificial" electromagnetic repulsion when the coil B_1 is energised is proportional to the surface area of the triangle 7. The polar expansion E_1 moves to E_1''.

With reference to Figure 3, a complete attraction and repulsion with alternating

steps of a polar expansion E_1, with a pair of heteronomous permanent magnets 3_1 and 3_2 of opposite polarity, is shown schematically. The polar expansion E_1 moves to E_1' by "natural" magnetic attraction between said permanent magnet 3_1 and the ferromagnetic core A_1. The corresponding energy is proportional to the surface area of the rectangle 8. The "artificial" electromagnetic repulsion when the coil B_1 is energised with positive electrical power proportional to the surface area of the rectangle 9. The polar expansion E_1 moves to E_1". Hence, by "natural" magnetic attraction with the permanent magnet 3_2, the polar expansion E_1 moves to E_1' ". The corresponding energy due to "natural" permanent magnetic attraction is proportional to the surface area of the rectangle 10. Thus, the "artificial" electromagnetic repulsion when the coil B_1 is energised with negative electrical power, proportional to the surface area of the rectangle 11, takes the polar expansion E_1 to E_1"", ready in attraction for another cycle. With reference to Figture 4, the mechanical coupling (C) distancing the ferromagnetic cores A_1 and A_2 for the balance of the "natural" permanent magnetic attraction forces between a permanent magnet and the other (3_1, 3_2, 3_3, 3_4, ...,) said ferromagnetic cores (A_1 and A_2) are distanced by a magnetic step p equal to half a permanent magnet, as in the motor shown by way of example in Fig. 1, or half permanent magnet plus one as in the scheme of the aforementioned example of a complete cycle Fig. 4, or half a permanent magnet plus a plurality of whole permanent magnets equally distanced (½, 1½, 2½, ...). Thus the "natural" ferromagnetic attraction torque forces are balanced and cancel each other out; moreover, the phase offset (p) between the coils (B_1 and B_2) by half permanent magnet has the purpose of completing with continuity the two parallel separate and superposed energy cycles over all the four steps necessary for the "natural" permanent attraction energy and to the "artificial" electromagnetic repulsion energy. Also schematically shown is the attraction cycle between the ferromagnetic cores A_1 and A_2 and the complete repulsion cycle of a pair of polar expansions E_1 and E_2 with the respective alternated heteronomous permanent magnets (3_1, 3_2, 3_3, 3_4) for each polar expansion E_1 and E_2 and each ferromagnetic core A_1 and A_2 one can repeat what has

been stated with reference to Figure 3, stressing again that, thanks to the half-magnet polar step (p), a harmonisation is reached between the "natural" magnetic forces and "artificial" electromagnetic forces, which leads to an increase in efficiency with respect to the case wherein power supply to the coils is continuous in the positive and respectively in the negative semi-cycle. The positive and negative electrical power supply cycle for the two coils of E_1 and E_2 is instead that of Figure 5, detailed in 12, 13, 14 and 15 for four steps of a complete cycle. Figure 6 instead shows the action of the ferromagnetic attraction forces in the same cycle steps 16, 17, 18, 19.

Therefore, when the dynamo-electric machine operates as a motor, each electro-magnetic coil is powered with positive and negative electrical current or vice versa only for two separate fourths of cycle during a complete attraction and repulsion cycle on two successive heteronomous magnets.

To summarise, the dynamo-electric machine according to the invention has in its primary at least a pair of polar expansions, whereof one positioned opposing the centre of a permanent magnet of a series of alternated heteronomous permanent magnets of the secondary, and the other expansion positioned opposing astride two of said permanent magnets. The pair of polar expansions has a function of balancing and completing the fractioned cycle of linear electrical power supply at contiguous segments as well as the "natural" fractioned cycle separately (the coils of the expansions work only in repulsion on the output of half the permanent magnets; the highly permeable ferromagnetic cores work only in attraction on the input of half the permanent magnets).

In other words, the power supply of the polar expansions at alternating steps occurs when the ferromagnetic core is at the centre of a permanent magnet in negative feedback until the end of the permanent magnet, whilst in natural ferromagnetic attraction from the start of the permanent magnet to its centre, first one then the other linearly uniting the fractioned force cycle. The energy developed in the electrical power supply cycle and the one developed in the natural permanent magnetic cycle are added in interacting forces at the axis of the machine. The altenated power direct

current power supply of the polar expansions and of at least one pair, first one and then the other expansion in negative feedback (repulsion) occurs at complete cycles and with continuous absorption and the "artificial" electrical energy is transformed into mechanical energy, whilst the attraction at alternating steps between the ferromagnetic cores of at least one pair and the permanent magnets at the input first one and then the other core, create a further "natural" mechanical energy superimposed and parallel, continuous and linear which is added at the axis with the transformed "artificial" energy. Vice versa, if the dynamo-electric machine of the present invention operates as a generator of mechanical energy the axis of the machine is powered with mechanical energy which is transformed into electrical current by each electro-magnetic coil for two separate fourths of cycle each during a complete cycle, the energy produced is drawn by means of the control system during the conductor steps, whilst the "natural energy" of the neutral steps active in attraction add their energy to the mechanical one provided to the axis, with the result of a dual transformed energy and with total power relating to the sum of each separate cycle; or with the separate and direct withdrawal from the equally positioned coils belonging to the two superimposed energy cycles, in this case their electrical energy can be rectified before rejoining at the output, or re-phased.

The harmonisation of the aforementioned interacting forces characterises the "energy generator" invention as a high efficiency dynamo-electric machine.

With reference to Figure 7, a schematic representation is provided of a first possible form of interaction of a polar expansion with closure of the magnetic flow and with a pair of heteronomous permanent magnets 3_1, 3_2 in opposite position with the ferromagnetic core (A_1'), as in the example of Figure 1, for rotatory and linear dynamo-electric machine, said polar expansion can be position both linear circular and longitudinally to the axis of the secondary with alternated heteronomous permanent magnets, in this case with double band.

With reference to Figure 8 the polar expansion E" has air gaps at both sides of a ferromagnetic core (A_1'') in axial disposition with respect to the band of the alternated

heteronomous permanent magnets for the closure of the magnetic flow 20, as in the case of a so-called linear and linear annular motor.

With reference to Figure 9, the polar expansion E" ' for the closure of the magnetic flow has permanent magnets at both sides of the ferromagnetic core (A_1" ') with two bands of alternated heteronomous permanent magnets 21, 22 belonging to two axial rotors or two linear tracks. Moreover, without references, it should be noted that for the construction and disposition of the polar expansions, of the ferromagnetic cores, of the permanent magnets and of its air gaps the realisation can be effected as in common and known dynamo-electric machines, it is just necessary according to the invention to respect the binomial of separation of the interacting flows to be harmonised with the alternating "artificial" electrical power supply of the active steps and of the neutral steps (not powered), which allow to exploit the "natural" potential attraction energy between the ferromagnetic cores and the permanent magnets always unbalanced in magnetic attraction step after step, main and necessary characteristic of the subject invention.

Purely by way of experimental, demonstrative, theoretical and practical example, the invention can be realised with two dynamo-electric machines with collector, appropriately and simply modified for the exploitation of the technique for separating the interacting forces constituting the subject of the invention: the two collectors are modified, each electrical polar step is divided into two steps, a neutral one and a conductor one, the axes of the two machines are fixed mechanically in series, forming a common mechanical axis, taking into account that it is necessary to offset by a polar step a collector of a machine with respect to the other one of the other machine, so that for instance in the case of a motor the electrical power supply powers at alternating polar steps first one machine and then the other, transforming the electrical energy from "artificial" repulsive electromagnetic force into mechanical energy, whilst the natural magnetic potential energy of the neutral polar steps in ferromagnetic attraction creates an additional "natural" mechanical energy parallel and superimposed with a resultant at the axis given by the sum of the energies at play,

separated and mutually harmonised: "artificial" plus "natural".

The invention thus conceived can be subject to numerous modifications and variations, without thereby departing from the scope of the inventive concept.

Claims

1. Energy generator as dynamo-electric machine with separate and harmonised employment of the positive and negative interacting forces at the input and output of the permanent magnets, characterised by a primary (2) comprising one or more pairs (C_1, C_2) of polar expansions (E_1, E_2; E_3, E_4), mechanically separated and electrically offset from each other by a polar step (p) and each provided with a ferromagnetic core (A_1, A_2, A_3, A_4) and with at least an electromagnetic coil (B_1, B_1', B_2, B_2'; B_3, B_3', B_4, B_4') and by a secondary (3) comprising a succession of alternated heteronomous permanent magnets (3_1, 3_2, ..., 3_{10}), and by a related control system (5), wherein each polar step (p) spans half a permanent magnet of said alternated heteronomous permanent magnets (3_1, 3_2, ..., 3_{10}), equal to a fourth of a complete cycle (p_1 or p_2) the magnetic forces being balanced by those of the permanent magnets for the characteristic paired disposition of the polar expansions active separately during the conductor steps (p_1) and its ferromagnetic cores active separately during the neutral steps in "natural" attraction (p_2), whose equilibrium disposition is obtained with the phase offset of the expansion pair with its ferromagnetic cores, one positioned at the centre of the permanent magnets and the other one distanced by a polar step (p) between two permanent magnets, thereby zeroing the competing forces, with a continuity, at alternating and superimposed steps, of "natural ferromagnetic" plus "artificial electromagnetic" energy in two complete superimposed energy cycles.

2. Energy generator as dynamo-electric machine according to claim 1, characterised in that the two separate energy cycles are divided into four fourths each acting on two permanent magnets of opposite polarity (3_1, 3_3, 3_5, 3_7, 3_9 with 3_2, 3_4, 3_6, 3_8, 3_{10}), in the first "natural energy" cycle at the input of the permanent magnets the two ferromagnetic cores of the pair (C_1, C_2) work first one then the other (A_1, A_3; A_2, A_4) during the alternating neutral steps (p_2) for two separate cycle fourths each in a complete cycle (16, 17; 18, 19) and in the second superimposed cycle of "artificial

energy" at the output of the permanent magnets, the polar expansions (E_1, E_2; E_3, E_4) of the pair (C_1, C_2) with its coils (B_1, B_1', B_3, B_3'; B_2, B_2', B_4, B_4') also work first one and then the other during the alternating conductor steps (p_1) for two separate cycle fourths each in a complete cycle (12, 13; 14, 15), all by means of the control system (5) that switches the neutral steps (p_2) and the conductor steps (p_1) alternatively on one (B_1, B_1', B_3, B_3') or the other coil (B_2, B_2', B_4, B_4') at the output of the permanent magnets.

3. Energy generator as dynamo-electric machine according to claim 1, characterised in that, when it operates as a motor, each electromagnetic coil (B_1, B_1', B_3, B_3'; B_2, B_2', B_4, B_4') is powered with positive and negative electrical current (12, 13; 14, 15) only for two separate cycle fourths during a complete repulsion cycle on two successive heteronomous permanent magnets during the conductor steps (p_1), switched by the control system (5), the electromagnetic energy is transformed into mechanical energy and goes to the axis (23) in parallel to the second superimposed cycle of "natural energy" (16, 17; 18, 19) produced by the ferromagnetic cores (A_1, A_3; A_2, A_4) at the input to the successive heteronomous permanent magnets during the neutral steps (p_2) also transformed in mechanical energy, with the addition of the two energies (12, 14, 13, 15) + (16, 18, 19, 17) and with continuous and linear absorption.

4. Energy generator as dynamo-electric machine according to claim 1, characterised in that, when it operates as a generator of electrical energy, the axis (23) of the machine is powered with mechanical energy which is transformed into electrical current by each electromagnetic coil (B_1, B_1', B_3, B_3'; B_2, B_2', B_4, B_4') for two separate cycle fourths each (12, 13; 14, 15) during a complete cycle (12, 13, 14, 15), the energy produced is drawn through the control system (5) during the conductor steps (p_1) whilst the "natural energy" of the neutral steps (p_2) active in attraction add their energy (16, 18, 19, 17) to the mechanical energy supplied to the axis (23) with

the result of a dual transformed energy (12, 14, 13, 15) + (12, 14, 13, 15) and with total power relating to the sum of each separate cycle.

5. Energy generator as dynamo-electric machine according to each of the previous claims, characterised in that the polar expansions (E_1 ...) of the primary (2) with the coils (B_1 ...) and the ferromagnetic cores (A_1 ...) are mechanically distanced from each other by a double polar step ($p_1 + p_2$) equal to an entire permanent magnet and all opposing the centre of the alternated heteronomous permanent magnets (3_1, 3_2, ...) of the secondary (3), whilst the working step (p) is always of a fourth of a cycle, equal to half a permanent magnet, the energy at play in the two separate cycles is not superimposed but dovetailed and in cyclical successions, for two separate cycle fourths (8, 10) between the "natural ferromagnetic energy" (E_1', E_1" ') and for two other separate cycle fourths (9, 11) with the "electromagnetic energy" (E_1", E_1"") for a complete cycle, alternate by contiguous of four fourths (8, 9, 10, 11), all controlled by a system that electrically connects the coils at alternating steps (p), a conductor step (p_1) and a neutral step (p_2) in cyclical sequence.

6. Energy generator as dynamo-electric machine according to each of the previous claims, characterised in that the polar expansions (E_1, E_2; E_3, E_4) of the primary (2) and the alternated heteronomous permanent magnets (3_1, 3_2, ..., 3_{10}) of the secondary (3) can be positioned indifferently opposite in the stator (2) and rotor (3) and vice versa.

7. Energy generator as dynamo-electric machine according to each of the previous claims, characterised in that the polar expansions (E_1, E_2, E_3 and E_4) of the primary (2) are positioned longitudinally to the axis of motion (23) with the secondary (3) and opposite to the North South permanent magnets (3_1, 3_2) also positioned longitudinally and in heteronomous alternated succession (3_1 and 3_2, 3_3 and 3_4, 3_5 and 3_6, ...).

8. Energy generator as dynamo-electric machine according to each of the previous claims, characterised in that the control system (5) comprises a collector with related brushes which electrically connect at alternating conductor (p_1) and neutral (p_2) polar steps (p) the coils (B_1, B_1', B_3, B_3'; B_2, B_2', B_4, B_4') of the polar expansions (E_1, E_3; E_2, E_4) said polar steps (p) switch with a frequency of a fourth of a cycle.

9. Energy generator as dynamo-electric machine according to claims 1, 2, 3, 4, 5 and 6 characterised in that the control system (5) comprises a decoder of the alternating polar steps (p) corresponding to the conductor steps (p_1) and neutral steps (p_2), by optical, magnetic, resistive, inductive or other measuring systems which drive an electronic control system with transistors, thyristors, triac or other means for the alternated electrical conduction switching of the coils (B_1, B_1', B_3, B_3'; B_2, B_2', B_4, B_4') relating to the polar expansions (E_1, E_3; E_2, E_4) said polar steps (p) switch with a frequency of a fourth of a cycle.

10. Energy generator as dynamo-electric machine according to claims 1, 2, 3, 4, 5, 6 and 7 characterised in that said polar expansion (E') cores (A') and said permanent magnets (3_1, 3_2) are opposite.

11. Energy generator as dynamo-electric machine according to claims 1, 2, 3, 4, 5, 6 and 7 characterised in that said polar expansion (E") cores (A_1") and said permanent magnets (20) are in an axial relationship.

12. Energy generator as dynamo-electric machine according to claims 1, 2, 3, 4, 5, 6 and 7 characterised in that said polar expansion (E' ") cores (A_1' ") are axially opposite pairs (21, 22) of said permanent magnets positioned laterally thereto.

13. Energy generator as dynamo-electric machine according to each of the previous claims characterised in that the disposition of the polar expansions (E_1, E_2, E_3 and E_4)

of the primary (2), of the alternated heteronomous permanent magnets (3_1, 3_2 ...) of the secondary (3) and of the control system (5) is indifferently rotatory, linear, linear annular, as well as with partial sectors for servo-controls destined to specific uses.

14. Energy generator as dynamo-electric machine according to each of the previous claims characterised in that the invention is realised by coupling (C_1, C_2) two traditional dynamo-electric machines (M_1, M_2), mechanically and electrically offset by the rotation of a fourth of a cycle equal to one polar step (p) of one (M_1) with respect to the other (M_2) and mechanically fastened in line in a common axis (23) and which works through the control system (5) electrically switching first a dynamo-electric machine (M_1) then the other (M_2) for two separate fourths each (12, 13; 14, 15) in a complete cycle of four fourths of electromagnetic energy (12, 14, 13 and 15) during the conductor steps (p_1) and four superimposed fourths of natural energy (16, 18, 19, 17) relating to the neutral polar steps (p_2).

15. Energy generator as dynamo-electric machine according to each of the previous claims characterised in that the invention is realised with a common traditional dynamo-electric machine wherein the switch of its expansions E_1, E_2, ...) is performed for instance with a traditional collector (5) having twice the number of polar steps (p), a conductor step (p_1) and a neutral step (p_2) equal to two separate cycle fourths each (8, 10 and 9, 11), functioning in cyclical sequence for a complete alternated by contiguous cycle of four fourths (8, 9, 10, 11).

16. Energy generator as dynamo-electric machine according to each of the previous claims characterised in that the permanent magnets (3_1, 3_2, 3_3, ... 3_{10}) which create the magnetic field are constituted by electromagnets excited electrically in negative feedback.

ABSTRACT OF THE DISCLOSURE

The present invention relates to a generator of energy as a dynamo-electric machine with employment of the parallel and superposed forces, of "artificial electromagnetic reaction" between the primary (2) and secondary (3) of "natural ferromagnetic reaction" between the secondary and the primary. The primary comprises one or more pairs (C_1, C_2) of polar expansions (E_1, E_2; E_3, E_4), mechanically separated and electrically offset in phase from each other by a polar step (p) and each provided with a ferromagnetic core (A_1, A_2; A_3, A_4) and with at least an electromagnetic coil (B_1, B_1', B_2, B_2', B_3, B_3', B_4, B_4'), the secondary (3) comprises a succession of alternate permanent magnets (3_1, 3_2,…, 3_{10}), and a related control system (5). Each polar step (p) spans half a permanent magnet of said alternate permanent magnets (3_1, 3_2,… 3_{10}), equal to a quarter of a complete cycle (p_1 or p_2), the magnetic forces being balanced due to the characteristic paired disposition of the polar expansions active separately during the conductor steps (p_1) and its ferromagnetic cores active separately during the neutral steps in "natural" attraction (p_2) with the permanent magnets.

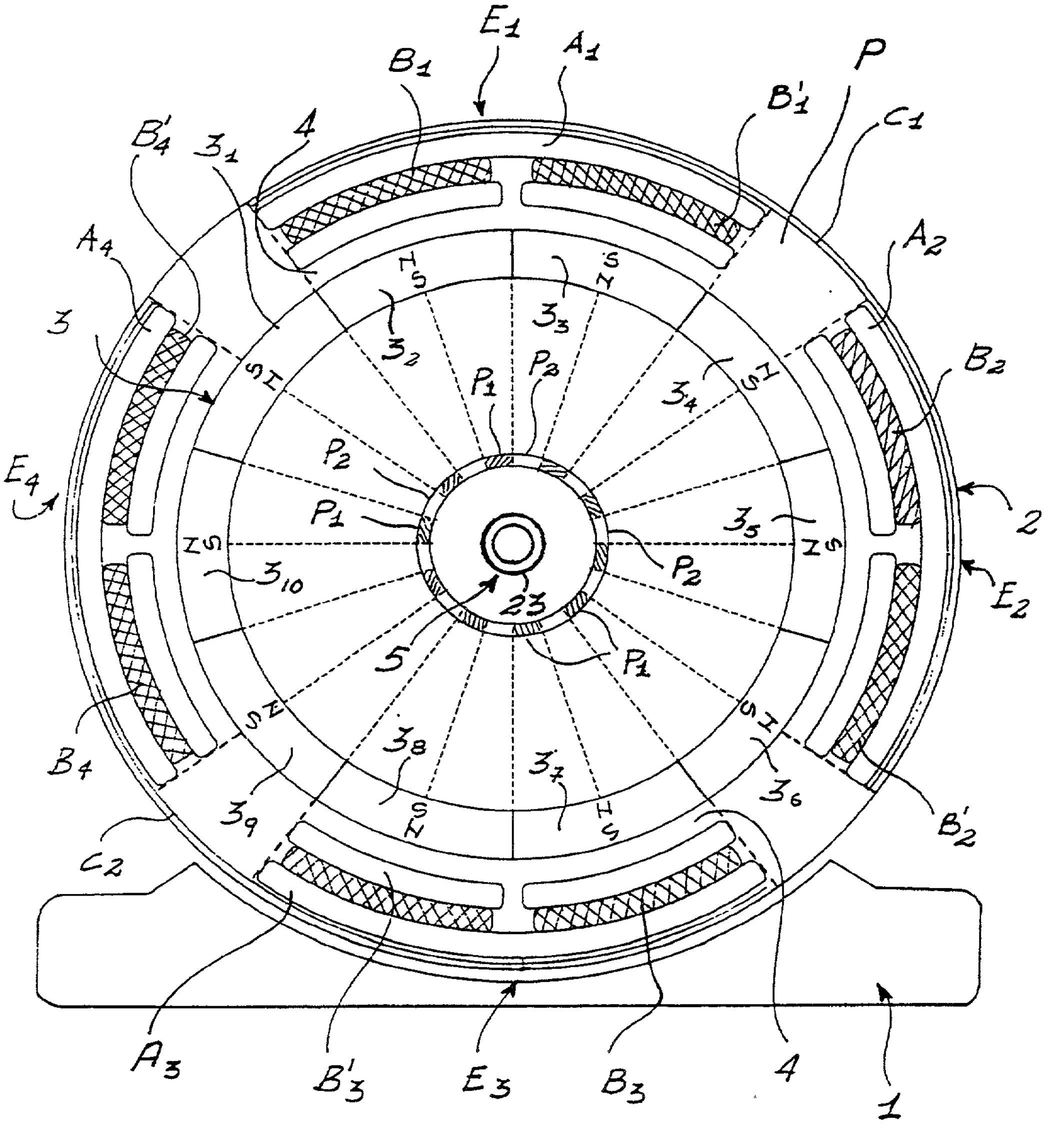

E1
A1
B1
P
B'1
C1
B'4
31
4
A4
A2
3
32
33
34
P1
P2
B2
E4
P2
P1
35
P2
2
310
23
E2
5
P1
B4
38
37
36
B'2
39
C2
A3
B'3
E3
B3
4
1
N
S

FIG.1

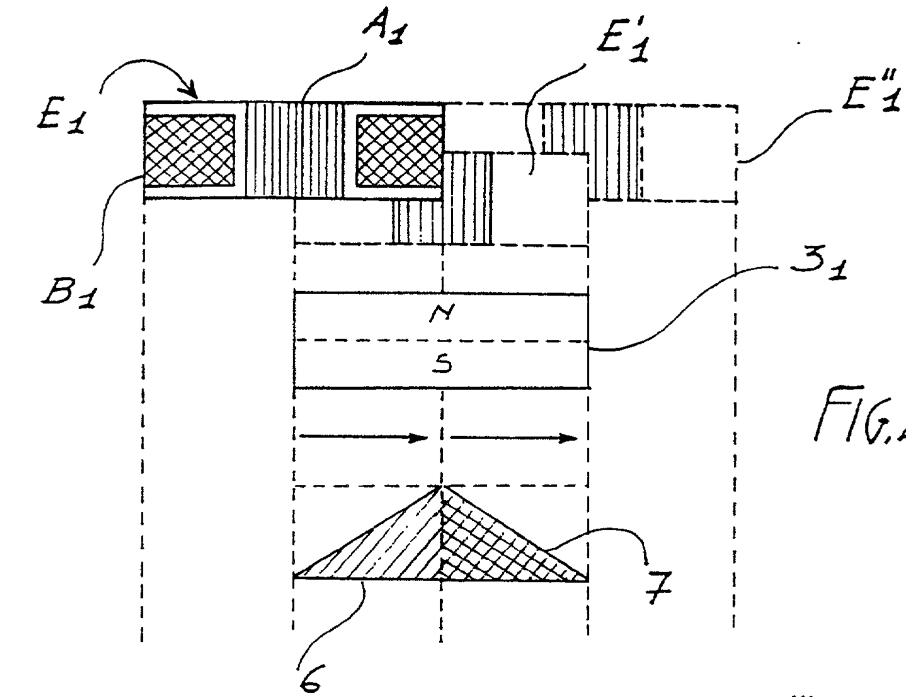


FIG. 2

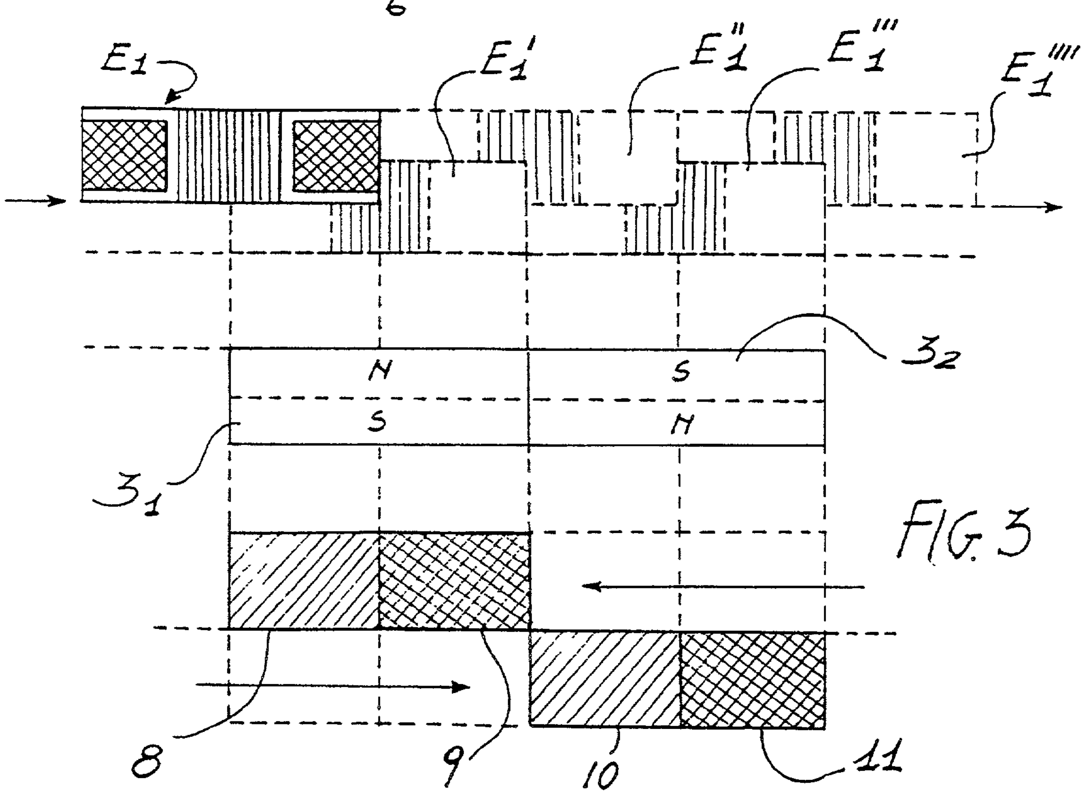
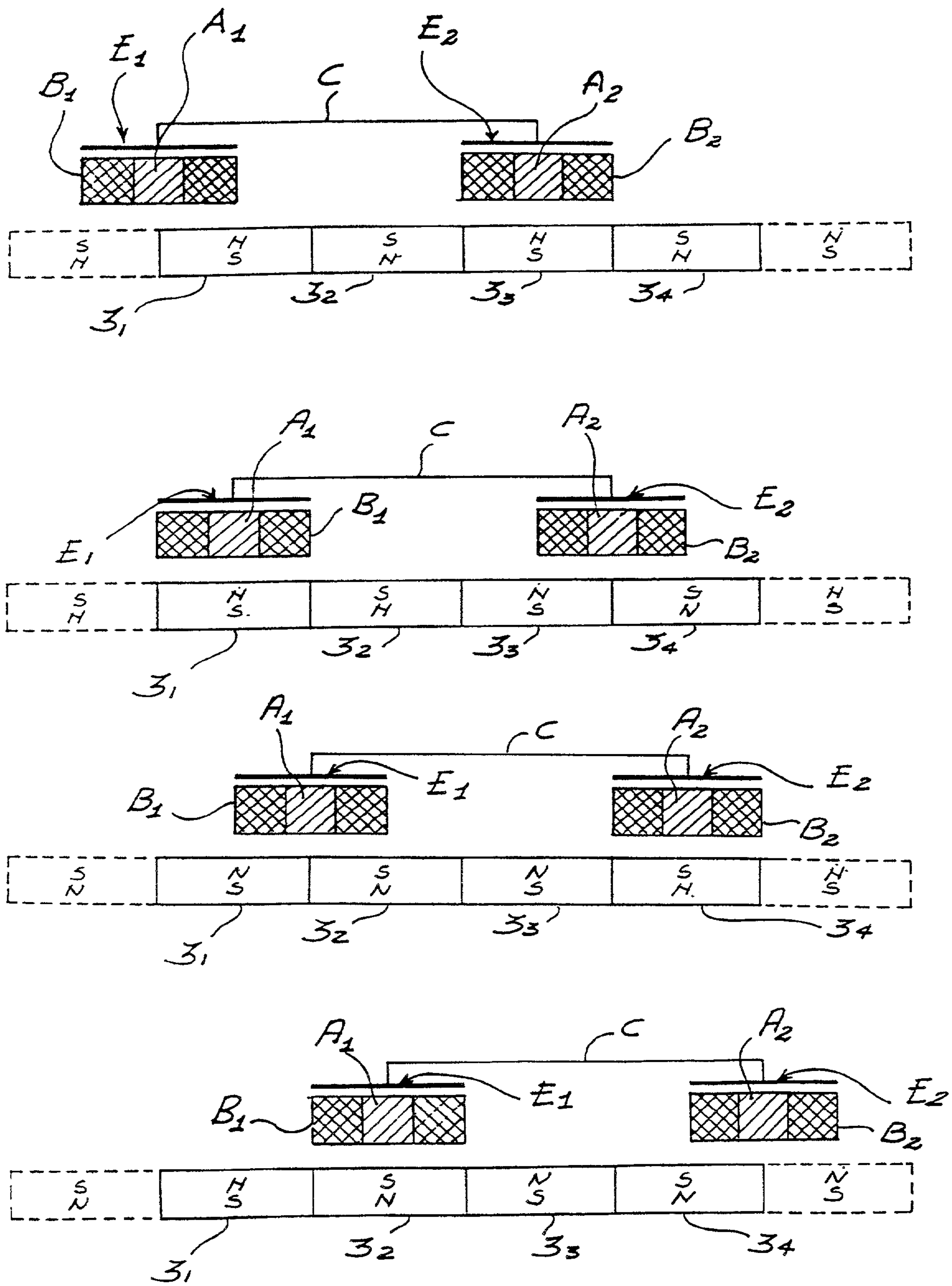


FIG. 3

FIG. 4



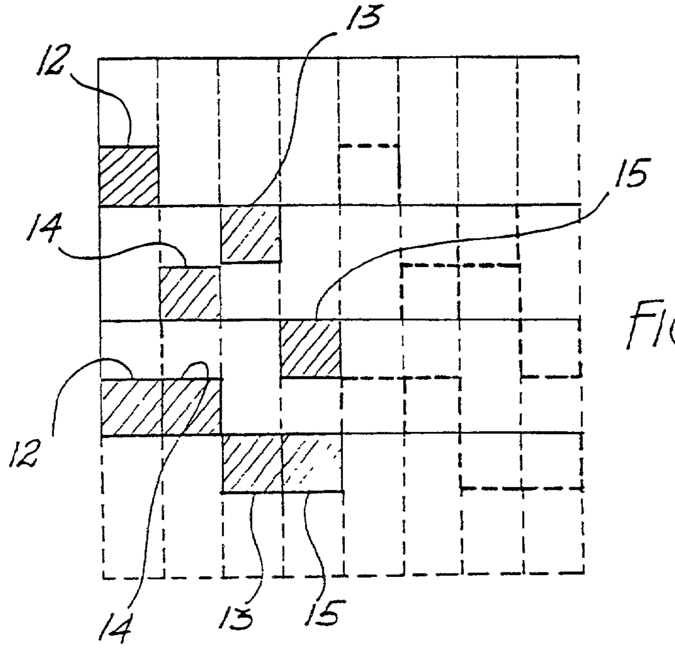


FIG.5

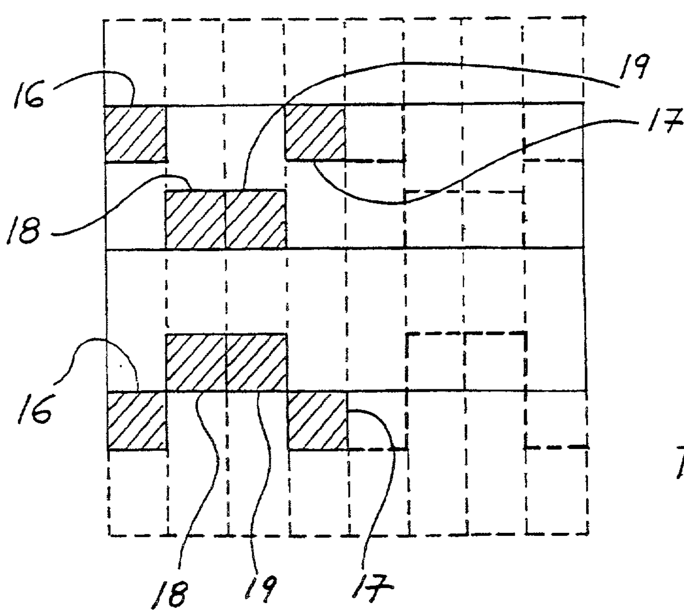


FIG.6

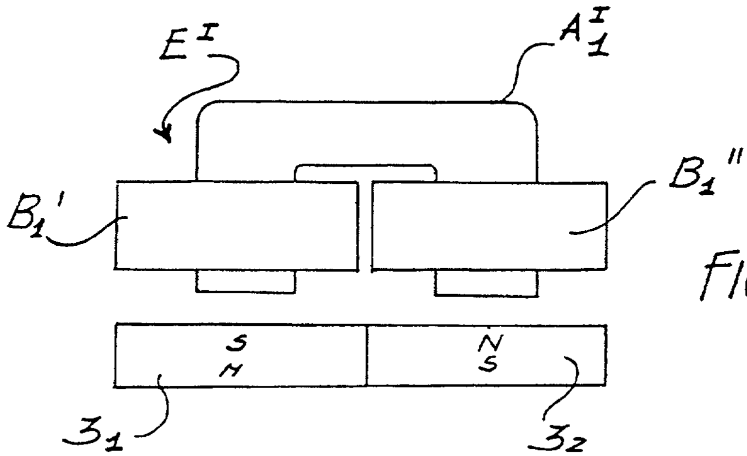


FIG.7

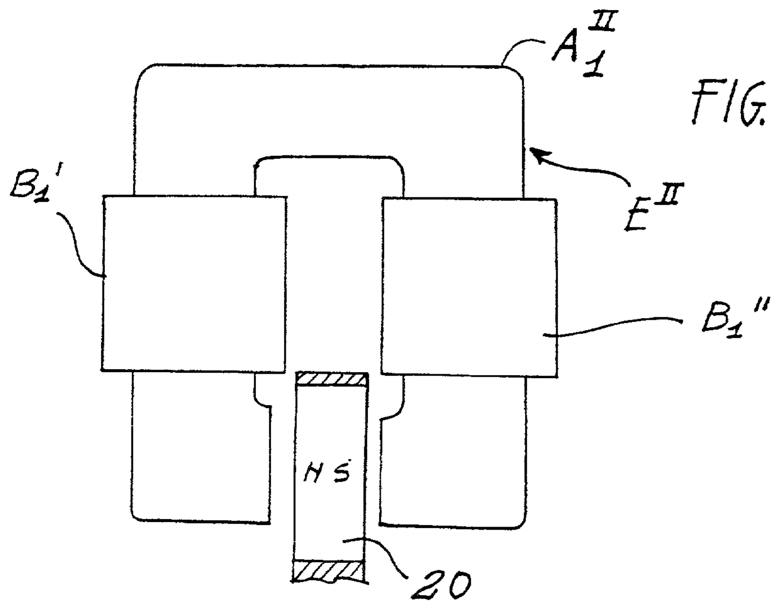
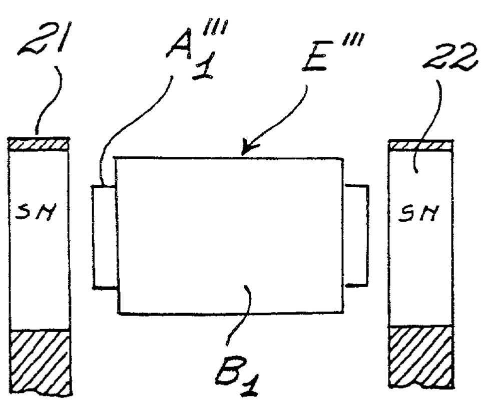


FIG.8

FIG.9



 [ ] Original [ ] Supplemental Atty. Docket:

Combined Declaration for Patent Application and Power of Attorney

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and that I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PERMANENT MAGNET ELECTRIC MACHINE WITH ENERGY SAVING CONTROL.

the specification of which (check one)

[ ] is attached hereto;
[ ] was filed in the United States under 35 U.S.C. §111 on ______________, as U.S. Appln. No. __________*; or
[X] was/will be filed in the U.S. under 35 U.S.C. §371 by entry into the U.S. national stage of an international (PCT) application, PCT/IT99/00388 filed 25.11.1999, entry requested on ______________*; national stage application received U.S. Appln. No. __________*; §371/§102(e) date ______________*
(* if known)

and was amended on ________________________________ (if applicable).
(include dates of amendments under PCT Art. 19 and 34 if PCT)

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and I acknowledge the duty to disclose to the Patent and Trademark Office (PTO) all information known by me to be material to patentability as defined in 37 C.F.R. §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §§ 119 and 365 of any prior foreign application(s) for patent or inventor's certificate, or prior PCT application(s) designating a country other than the U.S., listed below with the "Yes" box checked and have also identified below any such application having a filing date before that of the application on which priority is claimed:

(Number)	(Country)	(Day Month Year Filed)	YES	NO
IT-RM99A000066	ITALY	28.01.1999	[X]	[ ]
			[ ]	[ ]

I hereby claim the benefit under 35 U.S.C. §120 of any prior U.S. non-provisional application(s) or prior PCT application(s) designating the U.S. listed below, or under §119(e) of any prior U.S. provisional applications listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in such U.S. or PCT application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose to the PTO all information as defined in 37 C.F.R. §1.56(a) which occurred between the filing date of the prior application and the national filing date of this application:

(Application No.)	(Day Month Year Filed)	(Status: patented, pending, abandoned)

As a named inventor, I hereby appoint the following registered practioners to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

All of the practioners associated with Customer Number 001444

Direct all correspondence to the address associated with **Customer Number 001444**; i.e.,

BROWDY AND NEIMARK, P.L.L.C.
624 Ninth Street, N.W.
Washington, D.C. 20001-5303
(202) 628-5197

The undersigned hereby authorizes the U.S. Attorneys or Agents appointed herein to accept and follow instructions from ______________________ as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. Attorneys or Agents and the undersigned. In the event of a change of the persons from whom instructions may be taken, the U.S. Attorneys or Agents appointed herein will be so notified by the undersigned.

Atty. Docket:

Title: PERMANENT MAGNET ELECTRIC MACHINE WITH ENERGY SAVING CONTROL

U.S. Application filed __________, Serial No. __________

PCT Application filed 25.11.1999, Serial No. PCT/IT99/00388

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME ~~OF FIRST~~ INVENTOR	INVENTOR'S SIGNATURE	DATE
PATARCHI Alberto		23.07.2001

RESIDENT	CITIZENSHIP
ITALY	Italian

POST OFFICE ADDRESS
Viale della Marina, 3 - 00122 OSTIA LIDO (ROMA) - ITALY

FULL NAME OF SECOND JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

FULL NAME OF THIRD JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

FULL NAME OF FOURTH JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

FULL NAME OF FIFTH JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

FULL NAME OF SIXTH JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

FULL NAME OF SEVENTH JOINT INVENTOR	INVENTOR'S SIGNATURE	DATE

RESIDENT	CITIZENSHIP

POST OFFICE ADDRESS

ALL INVENTORS MUST REVIEW APPLICATION AND DECLARATION BEFORE SIGNING. ALL ALTERATIONS MUST BE INITIALED AND DATED BY ALL INVENTORS PRIOR TO EXECUTION. NO ALTERATIONS CAN BE MADE AFTER THE DECLARATION IS SIGNED. ALL PAGES OF DECLARATION MUST BE SEEN BY ALL INVENTORS.